A Typology of Municipalities' Roles and Expected User's Roles in Open Government Data Release and Reuse

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Abstract. The purpose of this paper is to identify the roles municipalities take when engaging in Open Government Data (OGD) and the expectations of user's roles they imply. According to the output delivered, the user can relate to data or data-based solutions. OGD is data released by public organisations to enhance government transparency, innovation, and participation. The realization of those benefits involves different roles, from providing data, developing solutions, to using them for a certain purpose. However, the definition of the municipalities' and users' roles in that context is unclear, which can impact the realization of the OGD benefits. This study uses Role Theory's concepts as an analytical lens, following the Design Science Research approach to create a typology. We conducted a hermeneutic literature review, identified, and analysed 52 papers, to build a typology of the municipalities' roles based on the goals, tasks, output delivered, and the expected users' roles they generate. It results in seven classes of roles coming in pairs. We tested the typology on empirical cases: the 28 Belgian and 158 Swedish municipalities engaged in OGD. Five role pairs were encountered in the empirical cases, and two occurred only in previous literature. The typology can help municipalities to understand how their role choice calls for a certain type of users that cannot be generalized as a "citizen". Role Theory opens new perspectives of research to understand their interdependence and raises fundamental role-related questions that should be given the same importance as technical and technological challenges.

Keywords: Open Government Data · Municipalities · User · Roles · Typology

1 Introduction

In 2013, the European Commission adopted the *Public Sector Information* (PSI) Directive (Directive 2013/37/EU), which encourages public organisations to share their information and data for reuse. The idea is that Open Government Data (OGD) is funded by public money and can generate social and economic value [1], therefore it should be made accessible to all. OGD is data released by a public organisation, the publisher, for secondary use, by a user, without any restriction or limitation in use. For a public organisation, the benefits of publishing OGD can be better transparency and accountability,

innovation and improved efficiency, and/or an increased engagement and participation in governance [2]. The municipalities play an important role because they own plenty of data (e.g., on transport, pollution, geographic data) [3] that can supply the regional and national portals and are amongst the most reused data sets [4].

However, publishing OGD is new for most municipalities and creates ambiguities in terms of role and scope of action, compared to their traditional role. To serve the common interest, several institutional paradigms co-exist, have different views about what is at stake, and bring different answers on how to achieve efficiency, accountability, and equity [5]. They create a variety of citizens' roles and modes of interaction [6]. In the same vein, what is included in the actors' roles to realize the OGD benefits is variable. For example, the public organisation can be limited to the publisher role [7] or considered as a data user [8, 9], a duality that is under-researched [10]. The citizen, which involvement in OGD is lacking empirical evidence [11], is broadly assimilated to a group of data users, or indirect beneficiaries (end-users) depending on intermediaries, developers or companies, to benefit from OGD [11, 12].

There are different approaches of role classifications in OGD literature: a process approach based on data value chain (e.g., [1, 7]), the data provision (e.g., [13]), the reuse process (e.g., [12, 14]) or the data ecosystems (e.g., [15]). They help to model roles to reach data value creation in an ideal world, as things happened in a continuous process and perfect interactions. However, they provide little insights about the influence of other roles (municipality *and* publisher) and projected expectations towards others. The purpose of this research is to investigate the possible roles of the municipalities, considering that they can be publisher and user, and deliver a certain type of output, data or solutions, for others to use. They generate expectations towards the user. To this end, we develop a typology of roles through the lens of Role Theory's concepts, following a Design Science Research approach. The research questions guiding the study are:

– *What are the possible municipalities' roles within OGD release and reuse?*
– *What expected users' roles are implied by t*h*e municipalities' roles?*

The typology should help to differentiate the municipalities' approaches to OGD, roles, and type of users they call for, and raise role-related issues that can impede the realization of benefits. The paper is structured as followed: the background introduces role ambiguities and the Role Theory's concepts used to develop the typology. Then, we explain the research approach, present the findings, discussion and conclusion.

2   Background

2.1   OGD Roles, Outputs, and Ambiguities

To generate benefits, the data needs to be made available. Then, it needs to be accessed by users, handled and repurposed to give it a new use and a broader value (e.g., insights, visualisations, or information solutions) [14]. Therefore, in OGD, the most comprehensive and acknowledged roles are (1) the publisher, the actor who publishes data, and (2) the user, the actor who makes a secondary use of it. Publishing and reusing data is not easy and can require new roles and intermediaries between the publisher and the user.

For example, a publisher might need the help of a portal provider to structure the data released on the web. A user might need the help of an enabler who provides tools or visualisations to facilitate data reuse in context [4]. The user can also have the expertise to develop solutions for others, make decisions, participate in governance processes, or benefit from new digitalized services. A complexity of OGD lies consequently in the role coordination around an output, to reach a higher purpose. The output delivered by the municipality can vary from raw data in an excel spreadsheet, datasets on a portal, visualisations and charts, or a complete information solution. To use the output, the user can need analytical skills or just be able to use a computer or smartphone. The expected user is moreover coloured with citizen's roles, to participate in the discussion, exchange of ideas and decision-making process with the government [16], enabled by OGD. Users can collaborate with decision-makers to create solutions based on OGD that will be implemented in the city [17] or consume the developed services.

The extent to the municipalities engage with OGD, therefore, has an impact on the user expected tasks and activities, to realize the higher purpose. When the municipalities' role and expectations are not in line with the user capabilities, resources, and motivations, there is a risk that the expected benefits will not be realized. To understand the relation of the actors through their role, Role Theory provides a relevant lens.

2.2 Role Theory

The concept of roles is widely used in the area of social sciences to explain human and organisations' behaviour patterns. It assumes that people have social positions and hold expectations for their own behaviours and those of other persons, according to their role [18]. The concept of role can be extended to the concept of actors, understood as persons, entities, or organisations. "Role Theory" is a catchphrase grouping different research streams that study roles, with different perspectives and terminologies. In our context, three approaches can complement each other to understand roles in OGD.

The *functional approach* has focused on the behaviours of individuals occupying a social position within a stable social system. This perspective suggests that individuals within their social systems are taught norms and are expected to conform to those norms and sanction individuals who do not [18]. In the traditional conception of roles of the citizens and the government, as voters vs. elected representatives, or public managers vs. users, the boundaries of the roles are shared, normative. Clear expectations prescribe and explain behaviours. In OGD, the municipality might expect the public to reuse OGD as a tool to monitor public action because it is the duty of the citizens.

The *symbolic interactionist approach* assumes that roles are not consequences of one's position in a social structure, but that an actor can change its position as roles are context-specific [19, 20]. Roles are created through interactions with others, they are emergent and negotiable [18]. Network and innovation studies have focused on a processual aspect of roles that describes what actors intend to do. It implies that actors' roles can also be used for granting access to important resources. The roles are products of actors' interpretations of situations [19]. In OGD, it explains how the publishers rely on the users to innovate, providing creativity and skills that it has not internally. They bring essential resources to realize the expected benefits. The first two approaches of Role Theory can be considered normative.

Finally, *the task-based approach*, as suggested by Nyström et al. [21] for the study of open innovation networks (in Living Labs), looks at individuals using an ideal role to achieve a certain goal. The actor's role is created through action: the goal and the related tasks determine the role, which resources are allocated, and which actors are teamed up with. The roles emerge in the innovation process and, as the process is open, roles are not predefined. The same actor can have different roles. This approach is particularly relevant for our study, as the OGD reuse is an open innovation process by principle. It gives the appropriate flexibility to create role categories, necessary in OGD, where the roles are emerging and varying with the local contexts.

In sum, the **roles** are functions, tasks, and behaviours expected of parties in particular positions and contexts [22]. A **role-set** of an actor is related to the expected acting out of a role: required duties, activities, standards, objectives and responsibilities [23]; a role-set emphasises the interdependence between the actors within a certain structure: the actor who sends the role through expectations, and the focal actor, who receives the role [24]. The **role expectations** can be explicit (e.g., job description) or not (e.g., informal notions, agreements) [22].

Herrmann et al. [22] argue that the repetition of social interaction patterns until they can be anticipated, based on patterns of expectations, gradually develops new roles. They add that the development of roles is accompanied by role-mechanisms, i.e. interaction patterns for role-taking and role-making. The role-taking is acting with respect to the expectations, which can be potentially enforced by sanctions being imposed on the role actor [22]. The role-making is how a person lives a role, and how she transforms the expectations into concrete behaviour [22]. Role expectation is, therefore, a key concept in Role Theory. In the functional approach, the focus is on the given expectations (role-taking). In the interactionist approach, roles are emergent and negotiable, consequently, the actors interpret, organise, modify the expectations (role-making). In the task-based approach, the roles are defined by the network's goal and needs depending on the situation, there are constant occurrences of role-making and role-taking [21].

The study of role-sets and expectations can help to understand dysfunctions in the role-taking or making and its impact on the process. For example, role ambiguity is the lack of clarity of role expectations and the degree of uncertainty regarding the outcomes of one's role performance [25]. Role overload occurs when a person is faced with too many expectations [18]. Role malintegration occurs when interdependent roles do not fit well together [18]. In this study, we use concepts of Role Theory to develop a typology of roles and discuss the role-related issues.

3   Research Approach

The research approach to develop the typology is based on Design Research Science (DSR). This paradigm of research aims at developing solutions (artefacts) meeting defined goals, that contribute to the scientific knowledge base (rigour) and provide utility in the environment (relevance). To reach that purpose, a research project should, in as many iteration loops as needed, follow 6 steps: *identify and motivate the problem domain (1), define the objectives of the solution (2), develop (3), demonstrate (4), evaluate (5)*, and finally *communicate (6)* the results to the audience [26].

The problem (1) we identified is the lack of clarity in the role of the municipality and citizens identified in the literature. Accordingly, *the motivation and objective (2)* of this study are to design a typology of municipalities' roles when dealing with OGD, enlightening the expectations they project on the users. Such a typology can be used as a tool to diagnose the OGD approach of municipalities and help them to raise the critical questions of new role integration that OGD implies for all the actors.

To develop the typology (3), we used the method suggested by Nickerson et al. [27] anchored in DSR. A typology is a system of conceptually derived grouping. The method of Nickerson et al. [27] starts with the determination of the meta-characteristic, the most comprehensive characteristic that will serve as the basis for the choice of dimensions and their characteristics in the typology. In this research, it is the interdependence between the role of the municipality releasing or reusing OGD and the user of the provided output. Each characteristic should be a logical consequence of the meta-characteristic, in our case, relevant concepts from Role Theory: components of the role-set (e.g., tasks, responsibilities), output, and role expectation. The typology development, made in iterations, combined a conceptual method (deductive: conceptualizing the dimensions of the taxonomy without examining actual objects) and an empirical method (inductive: identifying a subset of objects that we want to classify).

The typology development was based on previous literature as it helped us to access more cases and potentially identify more roles than an empirical method. To review the literature, we used the hermeneutic method of Boell et al. [28], consistent with the DSR approach. It allows a progressive and critical understanding of a body of literature, through two intertwined circles of research that can be repeated several times: the searching and acquisition circle, and the analysis and interpretation circle. The software NVivo was used to store, code, analyse, and sort the selected papers. We conducted three cycles. We used the databases Google Scholar and Science Direct and, in the first cycle, the keywords "role", + "Government", + "Citizen", + "Open Government Data", then "Task", "Actors". We selected empirical papers wherein the words "role" and "open (government) data" appeared in keywords, abstract or body text, with the cities as a context. It resulted in the first iteration of the typology, with roles based on the level of engagement of the municipalities and the user's roles as citizens. For the second cycle, we extended the research with citation tracking (backward and forward literature search) and keywords of concepts discovered in the papers to find new papers. We came to the second iteration of the typology, but noticed overlaps between roles and dimensions due to conceptual ambiguities in the chosen characteristics and reuse of role classes of previous research. We detached ourselves from previous role classes and re-focused on the key concepts of Role Theory for the third iteration. We analysed one more time the goals, tasks, outputs and expectations to let emerge classes of municipalities' roles, and sort the empirical literature. In the third and last cycle of literature search, we focused on acquiring empirical and conceptual papers for the less covered roles (e.g., OGD + "commercial reuse", OGD + "citizen participation") and refined the typology in its fourth iteration. Conceptual papers helped us to strengthen the logic of the typology, i.e. its dimensions in accordance with the research purpose, and to understand the school of thoughts of the empirical studies. We coded and used 40 empirical papers and 12 conceptual papers to develop the typology. The roles are more often indirectly presented

than explicitly researched in the current OGD literature. They were not found with the names and the combinations presented in the typology, as they result from the analysis and understanding of the researchers.

To consolidate the typology and demonstrate (4) its relevance in practice, we collected primary empirical data for two national cases, Belgium and Sweden, wherein we analysed the municipalities engaged with OGD. Two cases allow better generalization. Those countries were chosen for their different level of maturity in OGD, according to the European Maturity Report[1], Belgium and Sweden being respectively follower and fast-tracker. Both countries have translated the European PSI Directive into their laws and encourage their municipalities to publish data. Belgium counts 581 municipalities, and Sweden 290. By comparing national data portals and lists of publishers, we identified 28 municipalities in Belgium and 158 in Sweden publishing or reusing OGD at the time of the data collection (January-February 2021). We applied the typology to each of them and used a directed content analysis [29]. We analysed the websites, portals, and all type of reported off-line activities that constitute the output and create a channel for interaction between the municipality and the user. We identified and tabulated their stated goals, expected users, activities and tasks through the output delivered to sort them per role classes. At the end of the analysis, *we evaluated (5)* the typology based on the ending conditions of Nickerson et al. [27] and concluded that they were met. The publication of the findings in that paper is part of the *communication (6)*.

4   Analysis and Findings

This section presents the typology of the municipalities' roles and expected user's roles (Table 1). The first column lists the municipalities' role, characterized by a set of goals, tasks, and output. In pair come one or several expected users' roles that interact with the municipalities in unique ways. Key references and the number of occurrences are specified. The sum of occurrences is higher than the total number of municipalities analysed, as the combination of roles is possible, which is further presented in the findings. Each pair of role class is subsequently elaborated with empirical examples.

The compliant data provider goes for the simplest way of providing data by responding to external data demand or pressure. For example, in Sweden, municipalities can freely upload their data on a platform managed by an association (Kolada), to allow the citizens to compare their performance. Nine municipalities refer to that website under a page labelled "Open data" or "PSI data", 118 just imported a script from Kolada's website that displays a selection of datasets, and only 13 of those provided contact details. For very broad goals (e.g., "*promote participation, democracy and growth*"), the municipalities provide what is strictly necessary and create huge expectations on the users. They are true **data hunters**: to find data, they have to be ready to explore websites and dig into unstructured datasets. These roles are not very documented in research, since they bring little knowledge about OGD, but they are the case of most municipalities that have not intention to invest time and resources in OGD.

Municipalities and citizens can both be **partners** and collaborate in projects led by third parties for new service development (user-centred approaches) and governance

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[1] https://www.europeandataportal.eu/en/dashboard/2020.

Table 1. Typology of the municipalities' roles and expected user's roles

Municipalities' role	Role-set (G: goal, T: examples of tasks and activities)	Example of output delivered to the user	Expected users' roles	Key references and number of occurrences in Belgium (BE) and Sweden (SE)
The Compliant Data Provider	G: Compliance with the law and public values (e.g., transparency) T: Answer requests; send data on demand, without specifically publishing it. Open "on-demand"	Unstructured data, formatted for internal use, delivered on-demand by email, or imported web pages showing a selection of data, with low engagement to improve it	**The Data Hunter:** The users are experts in data reuse and know what data they need to satisfy their goals (find information, innovate)	[30] BE: 0 SE: 127
The Partner	G: Support the development of new services and public value T: Participate in collaborative processes (for innovation, governance)	Client briefing, guidance and feedback, expertise for the under-development solutions, funds	**The Partner** in governance or innovation processes, as a project led by third organisations or researchers	[31–33] BE: 0 SE: 0
The Stand-Alone Publisher	G: Openness, transparency, economic growth, innovation, participation (multiple and broad goals) T: Publish data on a website or portal, with a supply-driven and often scattered approach	OGD portal or website, with data as the main content. Do not always provide contact forms	**The Rare Bird:** the users are the expert and can conduct all type of activities required to reuse data (searching, finding, cleansing, enriching, combining, visualizing, developing solutions). The provided data is believed to be enough	[34–36] BE: 23 SE: 24

Table 1. (*continued*)

Municipalities' role	Role-set (G: goal, T: examples of tasks and activities)	Example of output delivered to the user	Expected users' roles	Key references and number of occurrences in Belgium (BE) and Sweden (SE)
The Dedicated Publisher	G: Make the data appealing to reach the above mentioned multiple goals T: Make the data easy to use, accessible, provide extra tools and resources, publicize the data released and reuses (apps), release new data on a regular basis	OGD portal with extra content and functionalities to provide support and feedback (tools, tutorial, documentation, API's, technical standards, selection of best cases of reuses, feedback form)	**The Data Analyst and Developer:** develop new applications and solutions based on data, exchange ideas with the open community members, gives feedback to the publisher, analyse data for monitoring the public action	[1, 37, 38] BE: 4 SE: 6
The Enabler	G: Make the data reused to outsource innovation, service development, or to solve identified problems T: Raise the awareness and capabilities of the ecosystem, identify public issues, provide means and call for actions	Beside the portal, organizes hackathons, training programs, workshops, ideation platforms, innovation contests, guidelines, policies, places of collaboration and exchanges (ideas, resources)	**The Ideator, Innovator, Co-producer, Co-implementer:** share community needs, provide ideas, prototypes of solutions, applications, technical know-how, creativity, solve public challenges	[39–41] BE: 4 SE: 2
The Solution Provider	G: Provide public e-services and digital tools based on data for the citizens T: (Co-)fund solutions, develop tools	Dashboards, policy evaluation tools, improved public services	**The Smart Citizen:** use enhanced public services, make informed decisions, participate in governance processes	[8, 42, 43] BE: 8 SE: 2
The Orchestrator	G: Coordinate means and strategies together to reach a vision and purpose (smart city, data ecosystem) T: Develop policies, strategies, tools	Living labs, policies, change management strategies, global approach of data production, management and reuse, pilot projects	**The Data Producer:** generate data that is reused by the municipality **Innovator, Smart Citizen**	[44, 45] BE: 0 SE: 0

(decision-making, policy-making, monitoring). As the goal of the data reuse is clear, the process led and facilitated by a third party, municipalities and users can be called for expertise other than data analytics: field knowledge, community needs, creativity, voices in public debate. The expectations are directed to a role in society (user of public service, citizen), instead of technical expertise. However, the collaborative processes identified in our literature review were research-led projects and no cases were reported in the empirical material. These roles are temporary and reactive to external impulsion.

The **stand-alone publisher**, unlike the compliant data provider, shows intentions to join the OGD movement. Still, it has either not stated or very general goals (e.g., *"foster innovation and the development of applications", "promote the participation of all"*). The output can consist of only one to five datasets on a regional or national portal, a catalogue on the website, or owned external portals. The publisher follows a supply-logic: what is in house, cleanable and openable, or thought as a priority by the municipality, is released [34]. The publisher expects the rest of the reuse to be undertaken by the user, a **rare bird**. Despite the little resources provided and lack of channels to interact with the publisher, he would navigate between portals, find and reuse data, develop new solutions, and participate in governance processes and public debate, empowered by the information he would have extracted himself [35, 36].

The **dedicated publisher** has understood data only gain value being reused and tries to make it appealing. A common strategy to enhance reuse is to publish as much data as possible on an owned portal, which accessibility and user-friendliness depend on the functionalities offered by the portal provider. Besides extra information, technical documentation, portals can also include tools to visualise data and improve the data reusability, discoverability [37], even extent the technical development of data (e.g. linked open data, 1 municipality, BE). The municipality is aware of the difficulty of reusing OGD, but the output (portals, tools), can still be complex for a lay user. Part of the support is addressed to the **developers and data analysts**, who still are expected to develop services and solutions for the community.

As an **enabler,** the municipality moves beyond the publishing activities, seeing the need for a more interventionist approach. It enables the actors of an ecosystem to realize the benefits of OGD. It has still no control over the developed services but shows more leadership because its goal is to create public value, stimulate innovation to solve public issues and meet the citizen's needs. To achieve that, the municipality undertakes an enabling role that can be oriented towards the capabilities of the actors, the functioning of the ecosystem, or the motivation to solve specific issues. This role was well documented in previous research, as it was an ideal to aim. In practice, only six municipalities took that role, and organised workshops and hackathons. They serve as places to meet, raise public needs, exchange ideas and develop prototypes based on data. The municipality expects the citizens to be an **innovator, ideator, co-creator** of new services of public interest. Interestingly, that role can be limited in time, as it relates to a specific project. Three municipalities organised a single hackathon or similar, in two cases, funded by European projects, two ran yearly hackathons but stopped due to the pandemic, and one stopped due to the lack of sustainable results but is considering new ways to energize the user community.

When the municipality reuses its data, it becomes a **solution provider**. It can improve its processes and digitalized its public services [8]. Innovation and reuse are internalized. The user is a **smart citizen** who gets tools like dashboards and visualisation of key facts to monitor the performance of the city [8, 42] (9 municipalities), make better decisions, and trust the government [43]. Municipalities try to reduce the information asymmetry and encourage "citizen participation" in the decision-making process, but in the empirical cases, dashboards do not come along with off-line governance processes. It is more an open window on key figures and performance. Information can also be developed into applications (2 municipalities, e.g., an app for parking spots, cemeteries). Open data is integrated to the municipalities' core activities, and the key outputs are tools for transparency and digitalized information services.

In the role of **orchestrator**, the municipality put means together to reach a certain purpose (under its control), the transformation of the city into a smart city [44], a smart data ecosystem [45] or a platform model of data-driven public services [46]. The municipality takes the lead to fulfil its goal and strategy. The OGD is a piece of a larger program, which can enrol any of the municipality and citizens' roles previously cited. The difference is that the goal of the municipality is clear and its maturity in reusing data enables it to make strategic choices instead of experimentations with OGD. These roles were not observed in the empirical material.

We observed municipalities **combining roles**. One municipality (SE) was a standalone publisher (basic data catalogue) and temporary enabler (European project addressed to the citizens), three were stand-alone publishers and solution providers (app of visualisation of the key figures). Two added to the latter combo the enabler role (organisation of single or yearly hackathon). Finally, the dedicated publisher role was combined once with temporary enabler (unique hackathon), once with solution provider (app of cemeteries, visualisation of key figures), and twice with solution provider and permanent enabler (yearly activities with the users).

5 Discussion

The purpose of this study was to create a typology of roles for the municipalities within the spectrum of data release and reuse. Previous research on OGD roles took a technical perspective, dividing them between a succession of tasks and operations to reuse data and create value (e.g., [1, 7, 12, 14, 15]). Sieber et al. [13] take a government-citizen perspective, limiting the scope to data provision. We were missing a more comprehensive definition of roles, considering that in our context the data provider is also and first a municipality. They have to define the limits of their new OGD roles, which creates expectations towards the user. In this section, we further discuss the nuances between the identified roles and role-related issues. Then, we highlight discrepancies between the given importance to the roles identified in the literature, and their occurrences in practice.

Through the lens of the Role Theory's concepts, we can highlight three ways municipalities approach the OGD roles, as shown in Fig. 1. The partner and the compliant data provider are in reality in a focal role [24]. The role sender can be a citizen asking for data, a supra-government or an institution that push the municipality in the role of

data provider or partner. The stand-alone, dedicated publisher, and enabler, believe in the benefits of data and embrace a new but *distinct* role, imposed by the new activities coming along with data release. The stand-alone is doing what Sieber et al. [13] call "data-over-the-wall". The dedicated, with better tools, expects the user to provide new public services themselves ("Do-it-Yourself Government" [47]). The enabler makes its resources and knowledge available to the public, provides support to foster greater public value, embedded in an ecosystem view, but without active involvement in the development of solutions ("Government as a platform" [47]). However, the solution provider and orchestrator integrate data reuse in their operations to deliver digitalized services or improve public management.
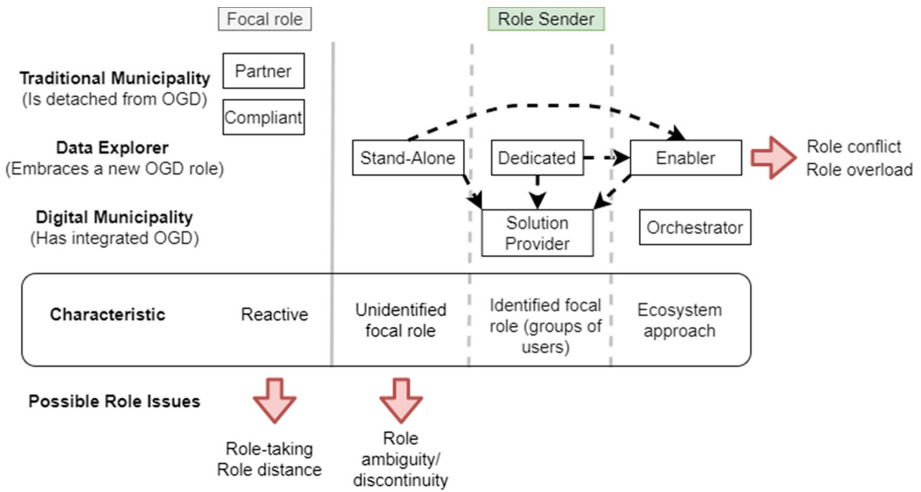

Fig. 1. The municipalities' roles combinations, characteristics, and issues (Authors)

More complex municipalities' perspectives on OGD show through the combination of roles. The stand-alone/service provider goes for the quick-wins: basic portals for the experts, easy to read visualisation for the other and transparency. The stand-alone /enabler/solution provider adds user interactions, which is interesting when the enabler role is recurrent: basic portals are balanced with regular hackathons. The stand-alone/temporary enabler is an experimenter, and the dedicated publisher/temporary enabler chooses to invest in a rich portal more than in user interaction. The dedicated publisher/solution provider is a logical combination that comes with experience and time: the more they publish data, the more they see opportunities for new services. The dedicated publisher/permanent enabler/service provider is probably the most engaged in OGD, intending to become a "data-driven" city.

Role Theory also allows identifying issues and ambiguities that can impair the realization of OGD benefits, as presented in Fig. 1. In a focal role, the municipality is in a position of role-taking that can be potentially enforced by sanctions [22] (laws regarding OGD), which can increase a role distance [22] and the absence of interest in providing data. The stand-alone publisher has an unidentified focal role ("anyone", role ambiguity),

without interaction with the user. Consequently, the output might meet the requirements of no one: there can be a role discontinuity [18] between the publisher and the user in terms of skills, objectives, and data available. The stand-alone, dedicated publisher, and enabler can raise a role conflict [25] for the municipality. If the data reuse is entirely delegated to independent users, can the public interest be guaranteed? Who is responsible for? The provided data (limited in quality, interoperability) combined with the high expectations (create applications for the citizens) can also generate role overload [18], a role wherein few users recognize themselves. In the context of OGD, where roles develop and are performed through the provision and the use of a complex output, a functional approach, which can fit with the organisational culture of traditional public organisations, can impede the OGD reuse and realization of its benefits.

In terms of occurrences, five of the seven roles were taken by the municipalities. The most represented role is the compliant data provider, in Sweden. Importation of Kolada's datasets on their website is considered sufficient to comply with their obligation of delivering data for transparency. It is reasonably arguable, however, that this operation results in the claimed objectives ("*promote participation, democracy and growth*"), as none of these pages reported initiatives making use of the data.

The most documented role, in our literature review, is the enabler (13 papers identified). According to research, the municipalities can, among others, provide training to build data-literacy [39], hackathons, workshops, understand the needs of the users [41], develop policies that focus on the availability of resources and good governance [48], encourage participation and balance the benefits of all type of users (companies, citizens, social organisations) [37]. In practice, the instances of enabler's roles are focused on the organisation of hackathons, which remained a unique or abandoned experiment for four cities. The lack of resources can be a reason, as two projects relied on external funding, but also the question of the role attribution: is that role of the municipality?

Finally, the roles of partners and orchestrators did not occur. The partner, as understood in the literature, is, in fact, a reactive role: the municipality joins an experimental process that intends to create value with data, led by other organisations. It depends therefore on external impulsion. The orchestrator is a role that requires a certain maturity with data and digitalization, together with ambition, vision, and resources. Capitals can more easily gather these conditions, such as London [45]. Brussels and Stockholm appear to be dedicated publishers. They invest more in appealing and well-provided portals than in the integration of the data in their operations with a coordinated vision.

The "citizen" turns out to be an elusive role that does not help to grasp the nuances between the expectations generated by the different municipalities' roles. This lack of clarity is substantial in the empirical material. The citizen's role is not stated ("*Open data is available for anyone*") or implied (transparency for the citizen to monitor) by the compliant data provider. For the stand-alone publisher, the citizen is the data user or user of future applications. The dedicated publisher addresses clearly its output to experts, while the enabler can see the citizens as idea providers. Solution provider and orchestrator, on the other hand, have a clear objective and output, and therefore defined user groups of democratic processes or digitalized services.

Implications for practice are that an interactionist and task-based approach would enable the actors to shape their role in relation to each other and the resources available,

through time and experience. "Open" should not mean "abandon" of and disconnection with the users. Until then, if the municipality can combine the role of solution provider with other roles, it can increased the perceived value of OGD for both municipalities and lay users, and avoid a role conflict that could cease the municipality's engagement in OGD. For research, Role Theory offers a new perspective to understand the difficulties and barriers faced by the actors in OGD. It raised fundamental role-related questions that should be given the same importance as technical and technological challenges.

6   Conclusion

Municipalities are encouraged to publish OGD, which is for most, a new role. There is no definition or limits regarding what a municipality is supposed to do and deliver to the user. However, the way they frame their role creates expectations towards the user. The interdependence between roles and generated expectations is not researched in previous literature, as roles are defined from technical and process perspectives. The expectations are ironed out or ignored, although it is a central concept in Role Theory. This study is the first to use Role Theory's concepts in the OGD field. With that theoretical lens, we develop a typology of municipalities' roles, coming in pair with expected users' roles. The way each pair interacts is unique. Seven pairs were identified and applied to the municipalities of two national cases, Belgium and Sweden. One of the main findings is that municipalities can detach themselves from the OGD roles, create new ones focussing on the provision of data and support for the user, or integrate OGD as part of their main operations. The aim of the typology is not to suggest an ideal-type role or path to follow, but to allow identifying municipal approaches to OGD and highlighting the possible role-related issues that could impede the realization of OGD benefits. The main contribution lies in the originality of the theoretical lens used, which opens a new perspective to understand the difficulties and barriers faced by the actors in OGD.

The study has limitations. It has focused on the municipalities and their users. It is however evident that they do not work in closed environments and other factors and actors influence the way they perceive and deliver output. The analysis of the data, information, tools and activities provided by the municipalities, pictures a situation at a time. It does not reveal uncommunicated intentions or future projects that could affect the role classification of the cases.

Future research could use the typology to conduct case studies and explore the factors or conditions that encourage the municipalities to take certain roles. With a time perspective, future research could explore what experiences and learnings make them evolve between roles, combine them, or stop and leave OGD. The typology could also be compared with the user perception of the municipality role, and explore how role-making interplays with role-taking for both users and municipalities.

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